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Environmental Research
Laboratory
Duluth MN 55804

Research and Development

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Project Summary

Interlaboratory Comparison: Acute Testing Set

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A multiple laboratory (6) set of tests was conducted using a single Test Standard Method. The tests consisted of static and dynamic aquatic bioassays with two species of fish and static tests with *Daphnia magna* in duplicate. The extreme values for any one test were one order of magnitude while the extremes of the means were only a factor of 2.

This Project Summary was developed by EPA's Environmental Research Laboratory, Duluth, MN 55804, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

The U.S. Environmental Protection Agency is required as part of the Toxic Substances Control Act to make decisions on the safety of any chemical before it can be marketed. These decisions must be based on various types of information regarding human, terrestrial and/or aquatic environmental danger potential. The law requires the potential manufacturers to provide such information if requested for cause by EPA. In the area of aquatic toxicity, bioassay data is one of the useful types of information that may be required.

Methods and Materials

The bioassay literature has a rather diverse amount of data on any one chemical. In an attempt to reduce this diversity it was decided to use a required standard test to produce the needed data. Estimations of expected diversity of such a standard when used by a variety of laboratories was needed.

To accomplish this a group of contractors (4) and two experienced EPA labs conducted a series of bioassays with two chemicals (endosulfan and $AgNO_3$), and two species of fish, fathead minnows (*Pimephales promelas*) and rainbow trout (*Salmo gairdneri*) and two types of acute tests, static and dynamic in duplicate for a test set of 96 96-hr LC50s. The same laboratories also conducted duplicate 48-hour acute static tests with *Daphnia magna* with both chemicals for a total of 24 tests. The chemicals and test protocol were the same for all laboratories. Each provided their own water, test animals, and chemical analytical support.

Results

The data set obtained revealed the following. An extreme value within any one test of one order of magnitude with the organic endosulfan tests. The means of the two duplicate tests between all laboratories was just over two times.

The silver results were approximately the same with the exception of one laboratory which had very hard (300 mg $CaCO_3$/l) water and, as expected, this value was much higher. The species difference was very large. The daphnia were approximately 10 times more sensitive to the silver and 200 times less sensitive to the endosulfan. Fish species difference was only about three times.

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Conclusions

The following conclusions were drawn. If a standard protocol is followed closely and a material is not water quality dependent, a very precise set of data can be expected. Species sensitivity is highly variable and species from widely diverse groups should be tested. The mean of repeated tests (at least two) apparently gives a number of sufficient precision that can be reproduced with confidence. Extreme care should be exercised in all extrapolations especially between diverse genetic groups.

*This Project Summary was authored by **Armond E. Lemke**, who was also the EPA Project Officer (see below).*

The complete report, entitled "Interlaboratory Comparison: Acute Testing Set," (Order No. PB 81-160 772; Cost: $6.50, subject to change) will be available only from:

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Telephone: 703-487-4650

The EPA Project Officer can be contacted at:

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